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### The Division of Logic

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# The Division of Logic

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## I. INTRODUCTION

In scholastic logic it is generally accepted that the first division of the subject of the science of logic is that into formal and material logic, the formal part being concerned with the form of reasoning, which must be correct, and the material with its matter, which must be true. This division has come to be regarded as essential: it is found almost universally in the manuals; John of St. Thomas, in his *Ars Logica* adopts this division, explains it, and founds his order of procedure upon it. The two parts — formal and material — are so accepted as distinct and separate parts that formal logic has come to be called minor logic and often to be considered as the whole of logic. Within formal logic itself John of St. Thomas, and the majority of the manuals together with him, make a further division, finding that this part is to be divided according to the three operations of the reason into the consideration of the term, the proposition, and the syllogism — to be considered in that order.

In view of the fact that this division is so generally accepted as essential to logic, it is striking that St. Thomas, in his two commentaries on books of Aristotle's *Organon*, does not so divide logic. In fact, the division he makes is quite different. In his commentary on the *Posterior Analytics* (and similarly in the introduction to his commentary on the *Perihermeneias*) he does not give as the first division that into formal and material. Rather, making no reference to any principle of division in the line of form and matter, he divides the entire science of logic into three parts, each of which is concerned with one of the three operations of the reason. Only after this division has been made does he take into consideration the form and matter of reasoning, that is, in the division of the third part. This diversity between what may be called the current division and the division made by a logician of the stature of St. Thomas gives reason to reconsider the division of logic. To this end St. Thomas' division will here be presented and its necessity investigated, then the foundations of the current division, and the parts resulting therefrom, in particular as these are presented by John of St. Thomas, will be evaluated. With the purpose of shedding more light on the nature of logic, the determination of its parts, and the order of their consideration, the study of St. Thomas' division will be complemented by that of the division made by Albertus Magnus in his commentary on the *Predicables*.

The importance of the correct division of logic needs little elaboration. It is the division made at the beginning that provides

the *ordo determinandi* of the science of logic. Once the common subject is known, the work of the logician is to arrive at a complete and distinct knowledge of that subject. But this is not possible unless at the beginning he determines whether that subject consists of determined parts, what those parts are, and in what order they must be considered. A bad division, obviously, can be the principle of omissions and of a faulty order of procedure which, because a distinct knowledge of certain parts depends upon a distinct knowledge of others which must be previously known, can render perfect possession of the science of logic impossible to obtain.

## II. ST. THOMAS' DIVISION

St. Thomas formally divides logic into its parts in his introduction to his commentary on Aristotle's *Posterior Analytics*. His purpose is to distinguish the parts of logic and to assign to each of the books of the *Organon* its proper subject and proper place in the ensemble of books. Prior to the division he makes known what it is that is to be divided. He does this first by defining the art of logic from its end, thus distinguishing it from all other arts, then by pointing out that logic is a science and indicating its subject matter. In the subject matter he finds the principle that divides the science of logic.

All the arts share a certain common end, which is to direct the operations of man's faculties so that man in those operations may proceed as he should proceed with ease to the attainment of some particular end.<sup>1</sup> A particular art, therefore, can be defined by indicating the faculty whose operations it directs and the end of the direction it provides to those operations. Thus, carpentry is the art which directs the operations of the hands so that man may proceed as he should and with ease so as to produce good chairs and the like. In the case of logic, the faculty whose operations are to be directed is the reason itself; St. Thomas, therefore, thus defines the art of logic: "... Ars quædam necessaria est, quæ sit directiva ipsius actus rationis, per quam scilicet homo in ipso actu rationis ordinate, faciliter, et sine errore procedat. Et hæc ars est *Logica*."<sup>2</sup> The end, which corresponds to the production of good chairs in the case of carpentry, is the end of speculative reason itself, which is to know the truth or to proceed without error.<sup>3</sup>

1. "Nihil enim aliud ars esse videtur, quam certa ordinatio rationis quomodo per determinata media ad debitum finem actus humani perveniant" (St. THOMAS, *In I Post. Anal.*, [edit. Marietti] prooemium, n.1).

2. *Ibid.*

3. ST. THOMAS brings this out elsewhere in his works. For instance, he teaches that logic must be learned previously to the other sciences because it teaches the mode of procedure in the other sciences (cf. *In II Metaphys.*, lect.5, [edit. Marietti] n.335). Again, he teaches that logic is the instrument of speculative science (cf. *In Boethium de Trinitate*, [edit. Marietti] lect.2, q.1, a.1, ad 2).

From the definition of the art of logic follows the determination of the subject matter of the science of logic. For logic can direct the operations of the reason only by making known the proper mode of operation of the reason. It must, therefore, study the act of reason ; this is its proper subject : "... Et haec ars est *Logica*, idest rationalis scientia. Quae non solum rationalis est ex hoc, quod est secundum rationem (quod est omnibus artibus commune) ; sed etiam ex hoc, quod est circa ipsum actum rationis sicut circa propriam materiam." <sup>1</sup>

Once the subject of the science of logic has been thus determined, St. Thomas proceeds to discover the parts of logic by an inspection of that subject. Since logic is concerned with the acts of the reason, then the diversity of the acts of reason causes the division of the science of logic ; since there are three operations of the reason, then logic is to be divided into three parts, each of which has for its subject one of these operations :

... Oportet igitur Logicae partes accipere secundum diversitatem actuum rationis.

Sunt autem rationis *tres* actus : quorum primi duo sunt rationis, secundum quod est intellectus quidam.

*Una* enim actio intellectus est intelligentia indivisibilium sive incomplexorum, secundum quam concipit quid est res. Et haec operatio a quibusdam dicitur informatio intellectus sive imaginatio per intellectum. Et ad hanc operationem rationis ordinatur doctrina, quam tradit Aristoteles in libro *Praedicamentorum*. — *Secunda* vero operatio intellectus est compositio vel divisio intellectus, in qua est iam verum vel falsum. Et huic rationis actui deservit doctrina, quam tradit Aristoteles in libro *Perihermeneias*. — *Tertius* vero actus rationis est secundum id quod est proprium rationis, scilicet discurrere ab uno in aliud, ut per id quod est notum deveniat in cognitionem ignoti. Et huic actui deserviunt reliqui libri Logicae.<sup>2</sup>

It is clear that, as was mentioned in the introduction, St. Thomas in this passage divides the subject of logic immediately into three parts according to the three operations of the reason. He makes no mention of formal and material ; it is not formal logic he is dividing into three parts, nor material, but the entire subject of the science of logic. The necessity of this division, however, is not immediately evident, nor does St. Thomas explain it. That there are three operations of the reason is known in psychology but, conceding this, the question still remains to be answered : why do these three operations necessarily divide the common subject of logic into those particular subjects that constitute its parts ?

In responding to this question, it must be recalled that logic is concerned with the operations of the reason precisely as those oper-

1. *In I Post. Anal.*, prooemium, n.2.

2. *Ibid.*, nn.3-4.

ations are subject to and require direction. If this subject is analyzed more deeply so that the formal subject of logic is manifested, then the causality of the diversity of the operations with respect to the division of logic into its parts becomes clear.

By way of such an analysis it may first be pointed out that, as St. Thomas teaches, all learning is acquired only from some knowledge already possessed.<sup>1</sup> Albertus Magnus teaches the same when he states that there is one common mode of the reason in all sciences, which is to advance from the known to the unknown.<sup>2</sup> Nature provides the first known notions — being, one, good, and the like, and the composite first principles formed upon knowledge of these simple notions — from which the advance begins. In advancing from the known to the unknown the reason, because it abstracts its concepts from phantasms, can proceed only by ordering its concepts to one another and composing them ; this is its natural mode of procedure.<sup>3</sup> As St. Albert points out, however, “imperfectus est qui in natura est : perficitur autem per artem adhibitam.”<sup>4</sup> Nature does not determine the reason to order its concepts as they must be ordered for the attainment of truth ; man does not instinctively form perfect definitions, for example, nor demonstrative syllogisms. Consequently, it is the work of ordering and composing concepts in advancing from the known to the unknown that is to be perfected by the direction of an art. The reason has the power to reflect on itself so as to discover its own proper mode of composition ; when this mode is learned, the habitual knowledge of it constitutes the art of logic. Since the end of the art of logic is the direction of composition in the operations of the reason, then when it is said that the subject of the science of logic is the acts of the reason, this means the order or determined relations that hold good between the concepts, governing their composition in those acts.<sup>5</sup>

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1. Cf. *ibid.*, lect.1, n.9.

2. “. . . Est tamen unus communis modus scientiae per quoddam commune quod est in omni scientia. Et hoc est quod per investigationem rationis ex cognito devenitur ad cognitionem incogniti : hoc enim fit in omni scientia quocumque modo dicta, sive sit demonstrativa, sive non demonstrativa” (*De Praedicabilibus*, Tract.I, ch.1). The text of every logical work of St. ALBERT has been transcribed from the Borgnet edition, long out of print, and made available in mimeograph by Michel Doyon, 1215, chemin Sainte-Foy, Québec 6, Canada, (1950-1956).

3. For the explanation of the need of the reason to know by ordering and composing its concepts, see SHEILA O'FLYNN, “The First Meaning of ‘Rational Process’ according to the *Expositio in Boethium de Trinitate*,” in *Laval théologique et philosophique*, Vol. X (1954), pp.175ff.

4. *De Praedicabilibus*, Tract.I, ch.1.

5. “. . . Alius autem est ordo, quem ratio considerando facit in proprio actu, puta cum ordinat conceptus suos adinvicem, et signa conceptuum, quia sunt voces significativae” (*In I Ethicorum*, lect.1 [edit. Marietti] n.1). “Ordo autem quem ratio considerando facit in proprio actu, pertinet ad rationalem philosophiam, cuius est considerare ordinem partium orationis adinvicem, et ordinem principiorum adinvicem et ad conclusiones” (*Ibid.*, n.2).

The concepts of the reason are by their very nature interrelated in a definite fashion ; the order that holds good among them is a necessary order, determined by the nature of the concepts as they are abstracted by the reason.<sup>1</sup> The relations constituting this order, because they are found to exist between concepts, or between concepts and reality, are in the strictest sense relations of reason ;<sup>2</sup> their cause is the reason, they accrue to objects only as they are known and not as they are in reality ; they cannot be attributed to objects as they are in reality. Because these relations, as properties of concepts, presuppose the presence in the mind of objects known, which are first intentions, they are called second intentions.<sup>3</sup> It is these that are the formal subject of logic which studies them *modo resolutorio*, defining and dividing them, and demonstrating their properties of them ; the conclusions of this science assume the character of certain principles or rules which direct the reasoning processes in the other sciences.

Since second intentions are the subject, to divide the science of logic is to divide second intentions. For St. Thomas the diversity of operations of the reason clearly causes such a division. The reason for this becomes manifest upon the consideration that second intentions are relations, but relations are divided according to their foundations. Thus, for instance, in the real order there are three different kinds of relations because there are three different foundations — quantity, action and passion, and measure.<sup>4</sup> But, since second intentions accrue

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1. For an explanation of the order which is the subject of logic, see O'FLYNN, *op. cit.*, pp.177ff.

2. " . . . Sicut realis relatio consistit in ordine rei ad rem, ita relatio rationis consistit in ordine intellectuum ; quod quidem dupliciter potest contingere. *Uno modo* secundum quod iste ordo est adinventus per intellectum, et attributus ei quod relative dicitur ; et huiusmodi sunt relationes quae attribuuntur ab intellectu rebus intellectis, prout sunt intellectae, sicut relatio generis et speciei : has enim relationes ratio adinvenit considerando ordinem eius quod est in intellectu ad res quae sunt extra, vel etiam ordinem intellectuum ad invicem " (*Q.D. de Potentia*, q.7, a.11, c.). " . . . Ens est duplex : ens scilicet rationis et ens naturae. Ens autem rationis dicitur proprie de illis intentionibus, quas ratio adinvenit in rebus consideratis ; sicut intentio generis, speciei et similium, quae quidem non inveniuntur in rerum natura, sed considerationem rationis consequuntur. Et huiusmodi, scilicet ens rationis, est proprie subiectum logicae " (*In IV Metaphys.*, lect.4, n.574).

3. " Prima enim intellecta sunt res extra animam, in quae primo intellectus intelligendo fertur. Secunda autem intellecta dicuntur intentiones consequentes modum intelligendi : hoc enim secundo intellectus intelligit in quantum reflectitur supra se ipsum, intelligens se intelligere et modum quo intelligit " (*Q.D. de Potentia*, q.7, a.9, c.). " Ex hoc enim quod intellectus in se ipsum reflectitur, sicut intelligit res existentes extra animam, ita intelligit eas esse intellectas ; et sic, sicut est quaedam conceptio intellectus vel ratio, — cui respondet res ipsa quae est extra animam, — ita est quaedam conceptio vel ratio, cui respondet res intellecta secundum quod huiusmodi ; sicut rationi hominis vel conceptioni hominis respondet res extra animam ; rationi vero vel conceptioni generis aut speciei, respondet solum res intellecta " (*Ibid.*, q.7, a.6).

4. Cf. *In V Metaphys.*, lect.17, nn.1001-1005.



to objects known, their foundation is the object known as it is known, or the first intention. Then, since the mode of the object as it is known by any of the operations differs from its mode as it is known by the others, the foundation of the intentions differs according to the three operations and the operations themselves, therefore, are the principle of the division of the second intentions. There are, in other words, certain second intentions proper to the first act, others proper to the second, and others proper to the third ; for the direction of all three operations, all of these intentions must be known. The division of logic, therefore, into three parts according to the three operations of the reason is a necessary division, caused by the nature itself of second intentions as a kind of relation.

In order to establish the diversity of the foundations of the second intentions, the three operations may here be considered briefly, but sufficiently to indicate that to each certain relations of reason accrue proper to itself. The following passage from the *Summa Theologica* may serve as a guide in this consideration :

... Intellectus humanus necesse habet intelligere componendo et dividendo. Cum enim intellectus humanus exeat de potentia in actum, similitudinem quamdam habet cum rebus generabilibus, quae non statim perfectionem suam habent, sed eam successive acquirunt. Et similiter intellectus humanus non statim in prima apprehensione capit perfectam rei cognitionem ; sed primo apprehendit aliquid de ipsa, puta quidditatem ipsius rei, quae est primum et proprium objectum intellectus ; et deinde intelligit proprietates et accidentia, et habitudines circumstantes rei essentiam. Et secundum hoc necesse habet unum apprehensum alii componere et dividere, et ex una compositione ad aliam procedere ; quod est ratiocinari.<sup>1</sup>

The potential character of human knowing, therefore, requires that the intelligence advance to perfect act, which is complete knowledge of the whole being of the object, by a succession of operations.

By its first operation the intellect grasps something of the essence of the object, or, at most, the whole essence perfectly ; but it grasps no more than the essence, leaving aside all else that pertains to the being of the object. The second intentions which constitute the subject of the logic of the first operation, therefore, are all those formed by the reason in knowing simply the essences of things ; it is these that must be known for the direction of the reason in attaining such knowledge.

Because the first operation leaves the intelligence still in potency with respect to all that pertains to the being of the object but not to its essence, the reason has need of its second and third operations. It must multiply its representations, knowing by separate apprehensions the accidents of the object. Then it has no way of knowing that the

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1. *Ia Pars*, q.85, a.5, c.

accident pertains or does not pertain to the object other than through two further operations. In its second it composes the accident with the object, or divides it from it by means of predication ;<sup>1</sup> then it has need of its third, in which it has recourse to a middle term, forming an argumentation through which the necessary inherence of the accident in the object is seen.<sup>2</sup> As soon as the reason composes or divides in its second operation, affirming or denying something of something else, that composition is either conformed with reality or it is not, that is, it is either true or false. The logic of the second operation, therefore, is concerned with those second intentions that accrue to the object as it is known under the form of affirmation or negation, or, in other words, with the second intentions that must be known for the constitution of *ens verum*, and those that follow upon the constitution of *ens verum*.<sup>3</sup> By the third operation, as indicated, the object is known by means of argumentation, which presupposes the first two operations. Accordingly, the second intentions which form the subject of this part of logic are composed of that complex series of relations of reason, founded on prior relations, that govern argumentation.

In his division of logic at the beginning of his commentary on the *Perihermeneias*, St. Thomas explicitly notes the order to be followed by the logician in the consideration of the operations of the reason. In establishing this order, he first identifies the three operations and then adds : " Harum autem operationum prima ordinatur

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1. " Attende autem, quod praedicari idem est quod attribuere per notam compositionis : quando enim unum alteri attribuitur mediante compositione, quam significat hoc verbum *est*, tunc praedicatur : et quando unum ab altero dividitur mediante negatione talis compositionis, sicut cum dicitur, homo non est lapis : tunc lapis dividitur ab eo. Et hoc fit in intellectu componente vel dividente ; in re enim ipsa sine nota compositionis vel divisionis, unum in altero est, vel non est. Sed intellectus componens vel dividens hic sine nota compositionis vel divisionis, hoc significare non potest : et, ut hoc significet, invenit modum compositionis unius cum alio ; et hoc est praedicare unum de alio, vel negare unum ab alio " (ST. ALBERT, *De Praedicabilibus*, Tract.III, ch.3).

2. Here ST. THOMAS mentions only predication of accidents of the object because his purpose is to manifest the necessity of the second operation, which has its root in the imperfection of the first. This does not mean that the second operation does not also compose essential notes of the object, known to pertain to it by the first operation, with the object.

3. " Intellectus autem habet duas operationes, quarum una vocatur indivisibilium intelligentia, per quam intellectus format simplices conceptiones rerum intelligendo quod quid est uniuscuiusque rei. Alia eius operatio est per quam composit et dividit.

Verum autem et falsum, etsi sint in mente, non tamen sunt circa illam operationem mentis, qua intellectus format simplices conceptiones, et quod quid est rerum. Et hoc est quod dicit, quod ' verum et falsum, circa simplicia et quod quid est, nec in mente est.' Unde relinquitur per locum a divisione, quod ex quo non est in rebus, nec est in mente circa simplicia et quod quid est, quod sit circa compositionem et divisionem mentis primo et principaliter ; et secundo vocis, quae significat conceptionem mentis. Et ulterius concludit, quod quaecumque oportet speculari circa ens et non ens sic dictum, scilicet prout ens significat verum, et non ens falsum, ' posterius perscrutandum est,' scilicet in fine noni et etiam in libro *de Anima*, et in logicalibus. Tota enim logica videtur esse de ente et non ente sic dicto " (In VI *Metaphys.*, lect.4, nn.1232-1233).



ad secundam : quia non potest esse compositio et divisio, nisi simplicium apprehensorum. Secunda vero ordinatur ad tertiam : quia videlicet oportet quod ex aliquo vero cognito, cui intellectus assentiat, procedatur ad certitudinem accipiendam de aliquibus ignotis.”<sup>1</sup> The order here indicated is a natural order of dependence : the third operation necessarily presupposes the second, and the second the first.

St. Thomas next designates the books of the *Organon* concerned with each of these operations — the *Predicaments* with the first, the *Perihermeneias* with the second, the *Prior Analytics* and all that follow with the third.<sup>2</sup> Because these books, or groups of books, are each concerned with one of the operations, to designate their order to one another is to determine the order in which the operations are to be considered. St. Thomas thus indicates the order of the books : “ Et ideo secundum praedictum ordinem trium operationum, liber *Praedicamentorum* ordinatur ad librum *Perihermeneias*, qui ordinatur ad librum *Priorum* et sequentes.”<sup>3</sup> The order of consideration of the parts, then, is determined by the natural order of the operations themselves.

For the understanding of the necessity of this order, it is necessary only to recall that the subject of the science of logic is second intentions. But, since the first operation is presupposed to the others, the second intentions attached to the simple concepts are retained in all compositions and govern those compositions ; for this reason a distinct knowledge of the second and third operations is not possible without a distinct knowledge of the first. Similarly, relations of reason attached to the second govern the third. Accordingly, a distinct knowledge of the third is dependent on that of the second. For this reason the order of procedure in the science of logic is determined by the natural order of operations.

### III. ST. ALBERT'S DIVISION

Another division of logic, differing both from the current division and from that of St. Thomas, is that made by Albertus Magnus in his commentary on the *Predicables*. This division is worthy of consideration because it determines directly and distinctly, from the end of logic, the particular compositions of the reason that constitute the principal subjects of the various parts of logic, and the order of these subjects to one another and to the attainment of science.

St. Albert's division is ordered to the discovery of the parts of logic so that it may be known when the whole has been treated : “. . . Ut habitis omnibus partibus ipsius sciatur quando est perfecte vel im-

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1. In *I Periherm.*, prooemium, n.1.

2. *Ibid.*, n.2.

3. *Ibid.*

perfecte tradita.”<sup>1</sup> The understanding of his division is dependent upon two points relative to the subject and nature of the science of logic which he has established previously to his division. For this reason a brief summary of these points is a prerequisite to the consideration of his division.

At the beginning of the introduction to his commentary on the *Predicables* St. Albert is concerned with establishing that logic is a science in itself, distinct from all others. This he manifests by pointing out that the subject of logic, which is the common mode of the reason as it advances from the known to the unknown in any science, is proper to logic alone.<sup>2</sup> This mode is the subject of a science because it is a necessary mode, determined in its own nature by the abstractive character of the reason,<sup>3</sup> and because it has its own parts, and these have their own definitions and principles and properties which may be demonstrated of them: “. . . Investigatio enim, sive ratio investigans ignotum per notum, speciale quoddam est, quod passiones habet et differentias et partes et principia: quae dum de ipso probantur, ars et scientia efficitur specialis, cujus usus postea omnibus adhibetur scientiis.”<sup>4</sup>

The second point of importance is the indication of a certain property of logic, following from the nature of its subject, namely, that logic is characterized by a particular *intentio*. By this is meant that logic tends to a definite end or object. Because the subject of logic is the mode of the reason as it advances from the known to the unknown, the principles and conclusions of the science of logic are marked by a unique character; that is, they assume the form of rules to direct the advance of the reason from the known to the unknown. For this reason, the intention of logic, or the object toward which it tends, is to teach how knowledge of the unknown is acquired: “. . . Logica docet qualiter ignotum fiat notum”;<sup>5</sup> it is for this reason that its “usus postea omnibus adhibetur scientiis.” It is precisely because logic possesses this *intentio*, teaching how to do something, that it is an art as well as a science.

This explanation of what is meant by the intention of logic is a prerequisite to St. Albert's division, because the division is founded on this intention:

Divisio autem logicae, et quae sunt partes ipsius . . . accipienda sunt ex intentione ipsius. Sicut vero iam ante dictum est, logica intendit docere principia per quae per id quod notum est, devenire potest in cognitionem ignoti. Est autem incomplexum, de quo quaeritur quid sit: aut com-

1. *De Praedicabilibus*, Tract. I, ch. 1.

2. *Ibid.*

3. *Ib. d.*

4. *Ibid.*

5. *Ibid.*, ch. 3.

plexum, de quo quaeritur an verum vel falsum sit. Sciri autem non potest incomplexum de quo quaeritur quid sit, nisi per diffinitionem. Complexum autem, de quo quaeritur an verum vel falsum sit, non potest sciri nisi per argumentationem. Istae ergo sunt duae partes logicae.<sup>1</sup>

The intention of logic is to teach how to advance from the known to the unknown. Reflection on the operation of the reason reveals that in its quest for science it encounters two kinds of unknown. The first is the simple unknown, which is the object of a simple apprehension ; knowledge of such an unknown is attained when the reason knows the essence and can answer the question : what is it? The second is a composition or division of the mind, signified by an enunciation. Since every composition or division is either conformed with reality or not, such an unknown is known when the answer can be given to the question : is it true or false? Or when, in other words, it has been judged. Since, therefore, the intention of the whole of logic is to teach how to arrive at knowledge of the unknown, and since there are these two kinds of *ignota*, known through answers to two different kinds of questions, it follows that logic is divided into two parts, one which *intendit docere* the principles governing the acquisition of knowledge of the simple, and one which *intendit docere* the principles directing the attainment of knowledge of the composite.

Each of these two kinds of *ignota* is made known by a means of knowing proper to itself. The simple is known when the reason is in possession of its definition.<sup>2</sup> The truth or falsity of a composition is known by some comparison of its terms with a third term, that is, through argumentation of some kind.<sup>3</sup> These two means of knowing differ from one another in their internal structure, and their formation is governed by different principles. They constitute, therefore, two subjects of logic and divide the science into two parts, one of which tends toward the direction of definition, the other toward the direction of argumentation :

... Istae ergo sunt duae partes logicae. Una quidem ut doceantur principia per quae sciatur diffinitio rei et quidditas : ita quod per principia illa doceatur quae sit vera rei diffinitio, et quae non, et quae videatur esse et non sit. Alia vero ut doceantur principia qualiter per argumentationem probetur enuntiationis veritas vel falsitas.<sup>4</sup>

With respect to the first part, this must teach all that the speculative scientist must know about the instrument for attaining

1. *Ibid.*, ch.5.

2. " Sciri autem non potest incomplexum de quo quaeritur quid sit, nisi per diffinitionem " (*Ibid.*).

3. " Complexum autem, de quo quaeritur an verum vel falsum sit, non potest sciri nisi per argumentationem " (*Ibid.*).

4. *Ibid.*

knowledge of the essences of things, or the work to be constructed by the reason in attaining such knowledge: "... Logicus docens quaerere scientiam incomplexi, docet instrumentum quo accipiat notitia illius secundum diffinitionem, et ea quae ad diffinitionem faciunt, et quae diffinitionem circumstant, et quae diffinitionem perficiunt, et ea quae diffinitionem mutant."<sup>1</sup> As St. Albert points out, no complete treatise on the art of definition has come down to us from Aristotle; <sup>2</sup> this does not mean, however, that there is no extant work of Aristotle on the first operation of the reason.

The second part must provide knowledge of all the principles governing the formation by the reason of the syllogism and other forms of argumentation, which are instruments for arriving at knowledge of the truth or falsity of an *ignotum complexum*. In this part the logician

... sic docens accipere scientiam complexi, docet syllogismum qui est illius proprium instrumentum, et docet alias species argumentationum, et principia syllogismi, et ea quae circumstant ipsum, et principia ipsius, et partes, et materiam in qua poni potest forma syllogismi, et aliarum argumentationum forma, et quae syllogismum immutant.<sup>3</sup>

#### IV. COMPARISON OF ST. THOMAS' AND ST. ALBERT'S DIVISIONS

The divisions made by St. Thomas and St. Albert are two distinct divisions. They are made from different principles; one terminates in three parts, the other in two. Yet both are solidly founded, one on the nature of the subject of the science and the other on the end of the art. Thus far the two have been presented separately; what remains is a comparison of one with the other, with the purpose of manifesting the relations between the respective parts and, particularly, the light shed on the subjects of the different parts of logic, their relation to one another, and the order of their consideration, by St. Albert's division, over and above what is revealed by St. Thomas'.

St. Thomas' division is a division of the science of logic as such, made according to essential differences in the subject matter, that is, the differences in the foundations of the relations of reason; an understanding of this division is essential for a distinct knowledge of logic as a science. Each of the parts has as its subject the second intentions involved in one of the operations of the reason. In identifying the subjects of each of the three parts, St. Thomas mentions that the logic of the first operation is concerned with the matter of Aristotle's *Predicaments*, that of the second with the matter of the

1. *Ibid.*, ch.7.

2. *Ibid.*, ch.5.

3. *Ibid.*, ch.7.

*Perihermeneias*, which is the enuntiation, and that of the third with the form of reasoning which is the simple syllogism (the subject of the *Prior Analytics*), the demonstrative and probable syllogisms (*Posterior Analytics* and *Topics*), the rhetorical enthymeme (*Rhetoric*), the metaphor of poetry (*Poetics*), and the sophistical syllogism (*Sophistics*).<sup>1</sup> In his introduction to his commentary on the *Perihermeneias* he teaches that the order of the consideration of the three operations is the same as the natural order of the operations themselves.

St. Albert in dividing logic makes no mention of the three operations of the reason as such. His division seems to be made according to the consideration of logic as an art rather than as a science, for he divides logic according to the direction to be provided to the reason in the formation of certain works which it must make according to determined rules for the attainment of determined ends. The questions implied in making his division (what are the ends to be attained? what are the determined means by which they are attained?) are questions proper to art rather than to science. The most important difference between the two divisions, namely, that between their resulting parts, may best be manifested by a comparison of these parts themselves.

The first part of St. Thomas' division is the logic of the first operation which, evidently, must have for its subject all those second intentions attached to simple concepts by the simple apprehension and which must be known for the direction of this operation. The first part of St. Albert's is the art of definition. Although St. Thomas mentions that the object of the first operation is the *quid est* of things, and although St. Albert teaches that the *quid est* is known by definition, still it would seem that the art of definition is not coextensive with the logic of the first operation. Rather, the latter includes the former as its principal part, but is wider in scope, embracing also certain intentions not pertaining to the art of definition, but formed by the reason in its first act, and ordered to a distinct knowledge of argumentation, as will be treated below in connection with the art of argumentation and more fully in a subsequent article on the logic of the first operation. As St. Albert explains in several places, for the possession of the art of definition a knowledge is necessary of the *Predicables*, the *Predicaments*, the science of division, and the rules governing definitions; but in so far as the first three of these contain many notions not directly ordered to the formation of definitions, the logic of the first operation is more extensive than the art of definition. Consequently, when St. Thomas states that the first part of logic is concerned with the first operation, he seems to be speaking of the subject in all its amplitude, including the art of definition as its principal part. In sum, St. Thomas, dividing logic as a science, gives

1. *In I Post. Anal.*, prooemium, nn.4-6.



as subject of the first part all second intentions pertaining to the first operation ; St. Albert's division, from the principle on which it is founded, imparts a certain determination to this subject in so far as it manifests that it must include, on the one hand, all that must be known for definition and, on the other, certain second intentions fundamental to argumentation.

The art of argumentation, as this constitutes the second part of St. Albert's division, seems to be divided into three separate and distinct parts, corresponding to the three operations of the reason, exclusive of the art of definition as such. St. Albert himself brings this out in a passage in his commentary on the *Predicaments*. After mentioning the two kinds of unknown and noting that the first is manifested by definition, he continues :

Complexum autem incognitum cognosci non potest nisi argumentatione. Dictum est etiam ad hoc, quod ratio (quae est virtus unum cum alio complectens) non potest devenire ad instrumentum quo cognitionem incogniti eliciat ex cognito, nisi tribus actibus, qui sunt ordinare unum ad alterum, componere unum cum altero, et colligere composita secundum discursum qui fit ex uno in alterum. Sic enim et non aliter accipiet cognitionem incogniti per id quod est cognitum.<sup>1</sup>

The first step in the art of argumentation is the ordering of the simple concepts to one another according to the intentions governing this disposition, which are the five predicables ; the disposition itself is accomplished in the *Predicaments* and pertains to the first operation. The second step teaches how to compose the concepts so as to enuntiate the true, either simply or modally, because argumentations can be formed only from truths enuntiated ; this is taught in the logic of the second operation.<sup>2</sup> Unless the disposition has previously been effected by the logic of the first operation, it is not possible to know, for instance, whether the predication in the composition enuntiated

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1. *De Praedicamentis*, Tract.I, ch.1.

2. ST. ALBERT thus explains that a knowledge of how to enuntiate and of the nature and properties of the enuntiation is necessary for the understanding of argumentation : " Quia vero syllogismus non scitur an sit compositum et complexum quid, nisi sciatur ex quibus et quot et qualibus est, et qualiter conjunctus, ideo habet agere logicus de enuntiatione et partibus et qualitatibus et compositione enuntiationis " (*De Praedicabilibus*, Tract.I, ch.7). Similarly, in his commentary on the *Perihermeneias*, he briefly indicates the relation of the study of the enuntiation to the knowledge of the syllogism : " Notandum est quod substantialis principalis hujus scientiae finis est constituere orationem interpretativam de re sub sermone veram interpretationem et perfectam perficiente . . . Ulterius autem habet finem : quia ordinatur ad syllogismum per quem scitur ignotum per notum in oratione interpretativa " (*In I Periherm.*, Tract.I, ch.2). From these passages it is clear that the study of the enuntiation is part of the art of argumentation, not however, of the logic of the third operation. The enuntiation is the subject of ARISTOTLE'S *Perihermeneias* which, as ST. THOMAS notes, is concerned with the second operation.



is *per se* or *per accidens*.<sup>1</sup> The third step is the formation of argumentations from truths enuntiated, and for the possession of this art a knowledge of the logic of the third operation, in all its parts, is necessary. The second and third steps here noted correspond to the second and third parts of St. Thomas' division; the first step, together with the art of definition as such, correspond with the first part.

This interpretation of the amplitude of the art of argumentation, as including the logic of the first operation, is substantiated also by another text in the *Predicaments* wherein St. Albert teaches that this work disposes the universals according as they stand to one another in different relations as subjects and predicates, and that a knowledge of these relations is ultimately ordered to the formation of argumentations.<sup>2</sup>

A certain objection to this interpretation of the extension of the art of argumentation seems to arise from the text cited above in presenting St. Albert's division of logic. For there he seems to identify the art of argumentation with the consideration of syllogisms of all kinds. He does, however, note that the art of argumentation includes in its subject the "*principia syllogismi*" and it seems, from the text just cited, that this phrase embraces the subject matter of the logic of the first two operations, in so far as the terms of syllogisms are universals, and its propositions are enuntiations. St. Albert himself teaches this explicitly in opening his commentary on the *Sophistics* when he mentions that the whole subject of logic is the syllogism, whose remote principles are treated in the *Predicables* and so on, and its proximate principles in the *Perihermeneias* :

Sed quia omnis argumentatio ad syllogismum reducitur, erit logica hoc modo dicta de syllogismo, cujus quidem principia remota (quae sunt praedicata et subjecta) in libris de *Universalibus* et *Praedicamentis* et *Sex principiis*

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1. ST. ALBERT thus explains the necessity of the disposition of the universals for a distinct knowledge of enuntiations (i.e., on the part of the matter enuntiated) : "... Non autem potest sic ex uno in aliud discurrere ratio, nisi prius accipiat unum in alio esse divisum *per se* vel *per accidens*. Et hoc esse non potest, nisi accipiat unum esse ordinatum ad aliud *per se* vel *per accidens*. Ordo autem est prioris et posterioris secundum naturam et esse : et sic accipit universale particulare *per se* vel *per accidens*. Et sic invenit modum praedicandi unum de alio, vel negandi" (*De Praedicabilibus*, Tract. I, ch. 7).

2. "Patet etiam quis finis ultimus et quis est finis propinquus. Ultimus enim est ut ex ordinatis ratio accipiat compositionis ad enuntiationem, quae sola inter orationes verum significat : et ulterior adhuc finis est, ut ex compositis eliciatur collectio consequentiae unius ex altero, per quam accipiat scientia complexi quod ignotum est. Finis autem propinquus est, qui est terminus operis, ut scientia habeatur ordinabilium secundum omne genus, secundum quod potest esse diversus modus praedicandi, vel diversus ordo praedicabilis ad subjectum de quo praedicatur" (*De Praedicamentis*, Tract. I, ch. 1). From this passage, and that cited in the preceding note, it seems evident that the logic of the first operation forms part of the art of argumentation; the disposition of the universals is, then, common to both the arts that form the two parts of ST. ALBERT'S division.

jam determinata sunt ex antecedentibus et diffinitionibus eorum secundum potestatem ipsorum, et per consequentia sunt determinata in libro *Divisionum*. Principia vero propinqua syllogismi et ingredientia substantiam ipsius, in libro *Perihermeneias* jam determinata sunt cum modo compositionis, sive sine modo.<sup>1</sup>

In concluding this comparison of St. Thomas' and St. Albert's divisions, it may be noted that, as St. Thomas points out, there are two objects of consideration in regard to the operations of the reason — the operations themselves, and certain works constituted by these operations :

... Sicut in actibus exterioribus est considerare operationem et operatum, puta aedificationem et aedificatum ; ita in operibus rationis est considerare ipsum actum rationis, qui est intelligere et ratiocinari ; et aliquid per huiusmodi actum constitutum ; quod quidem in speculativa ratione primo quidem est definitio ; secundo enuntiatio ; tertio vero syllogismus vel argumentatio.<sup>2</sup>

It is clear that St. Thomas, in making his division, turns his attention to the *actus rationis* ; from the fact that there are three operations of the reason, differing from one another in nature, it follows that the subject of logic, which is second intentions, must be divided into three parts. Thus, for St. Thomas, in sum, the fact that there are three operations is the cause of the division. In the case of the second and third operations he mentions the *opera constituta* — enuntiation and argumentation — that form the subjects of these parts. St. Albert, on the other hand, makes no reference to the operations as such. Rather, from the intention of logic he passes directly to the kinds of unknowns, and from these to the two *opera constituta* — definition and argumentation — which form the subjects of the two parts.

Because the principle of St. Albert's division (the intention of logic) reveals the art of definition as a separate part, it seems that this division makes an important addition to that of St. Thomas, for unless the two kinds of unknown are taken into consideration, there is danger that the disposition of the universals according to the *Predicables* and *Predicaments* be considered only as they are part of argumentation and that the art of definition be omitted from the logic of the first act. St. Albert's division, in other words, must be taken into consideration in determining the subject matter of the logic of the first operation. Because St. Albert is in several places concerned with establishing distinctly the relation of the different

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1. In *Libris Elenchorum Sophisticorum*, Tract. I, ch. 1. The work *De Sex Principiis* to which St. ALBERT here refers is a book of GILBERTUS PORRETANUS on the last six categories ; St. ALBERT has a commentary thereon.

2. *Ia IIae*, q. 90, a. 1, ad 2.

parts of logic to one another, the sum total of his texts on this subject (e.g., beginning of the *Predicables*, the *Predicaments*, the *Perihermeneias*, and the *Sophistics*) provide a more distinct knowledge of the *ordo determinandi* of logic than do the two passages (the beginnings of the *Perihermeneias* and the *Posterior Analytics*) in which St. Thomas divides logic.

#### V. CRITICISM OF THE DIVISION OF LOGIC INTO FORMAL AND MATERIAL

Thus far the divisions made by St. Thomas and St. Albert have been considered and an attempt has been made to show that both are solidly founded — one in the subject itself of the science of logic, and the other on the intention of logic. Neither St. Thomas nor St. Albert divides logic into formal and material, nor does either found his division on any principle in the line of form or matter. For neither is the term the subject of the logic of the first operation ; for both the subject of the logic of the second is the enuntiation (rather than the proposition) and that of the third is argumentation of all kinds. This part of the present article will be concerned with the division into formal and material, particularly with a criticism of the foundations on which this division rests. In the consideration of this division, John of St. Thomas' presentation of it will be used as a sort of *exemplar*, because his explanation of its foundations is more complete than is ordinarily found.

John of St. Thomas divides logic in the prologue to his *Ars Logica*. He introduces the division with the observation that in any art there are two principal objects of consideration : first, there is the matter, which is given, and presupposed to the operation of the art as the subject in which the art operates ; secondly, there is the form, which is induced in the matter by the art and whose induction is the principal object of the art :

In omni arte duo sunt praecipue consideranda, scilicet materia, in qua ars operatur, et forma, quae in tali materia inducitur, sicut in facienda domo materia sunt lapides et ligna, forma autem est compositio, quia ista inter se coordinantur in una figura et structura domus. Materiam artifex non facit, sed praesupponit, formam vero inducit, quae quia proprie educitur ab arte, est etiam principaliter intenta ab illa, utpote factura eius.<sup>1</sup>

After offering this observation on the double consideration common to all art, John of St. Thomas gives the definition of logic as "ars quaedam, cuius munus est dirigere rationem, ne in modo dis-

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1. *Cursus Philosophicus, Logica*, Prologus Totius Dialecticae, Praeludium Secundum, (edit. Reiser) p.5.

currendi et cognoscendi erret.”<sup>1</sup> Since, then, the word *art* appears as genus in the definition of logic, it is to be expected that two principal objects, in the line of a matter and a form, will divide the study of the logician.

As his next step, John of St. Thomas turns to that word in the definition which signifies the subject of the direction of logic — the word *reason* ; he must determine just what is meant by reason when it is said that logic directs the reason. He finds that by reason in this context is meant the act of judgment, in which the reason proceeds resolutely, arriving at the knowledge of some truth by resolving it into its principles ; hence for logic to direct the reason means no more nor less than to direct its resolute process : “ Et quia ratio ad discurrendum et ferendum iudicium procedit per modum resolutionis, hoc est, in sua principia deducendo et probationes, quibus manifestatur, discernendo, idem est Logicam dirigere rationem, ne erret, ac dirigere, ut recte et debite resolvat.”<sup>2</sup> But resolution is effected by the fulfillment of certain conditions : one on the part of the form assumed by the operation of the reason, namely, that it be right ; and one on the part of the matter, that it be certain.<sup>3</sup> John of St. Thomas thus explains what is meant by matter and what by form in this context : “ Materia sunt res seu objecta, quae volumus recte cognoscere. Forma autem est ipse modus seu dispositio, qua connectuntur objecta cognita.”<sup>4</sup>

Since, then, the work of logic is the direction of resolute reasoning, and since such reasoning involves a form which must be right, and a matter which must be certain, John of St. Thomas finds that the consideration of the logician must accordingly be divided into two parts, of which that which is concerned with the form precedes that which looks to the matter : “ Hinc ergo sumimus divisionem artis Logicae et facimus duas partes : In prima agemus de omnibus his, quae pertinent ad formam artis Logicae et ad prioristicam resolutionem . . . In secunda vero parte agemus de his, quae pertinent ad materiam logicalem seu ad posterioristicam resolutionem.”<sup>5</sup>

The reasoning that leads to his division, then, may be briefly resumed by pointing out that it is founded on two words, *art* and *reason*, which belong to the definition of logic. Because logic is an art, we should expect that something in the line of matter and form should fall under its consideration ; then, because to direct the act of reason is to direct resolution, which involves a right form and certain

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1. *Ibid.*

2. *Ibid.*

3. “ Fit autem recta resolutio tum ex debita forma, tum ex certitudine materiae ” (*Ibid.*).

4. *Ibid.*

5. *Ibid.*

matter, the art of logic is actually divided into a part which considers the conditions pertaining to right form and one that determines those pertaining to certain matter. It may here be pointed out that John of St. Thomas does not himself use the terms formal and material logic ; but the doctrine contained in the part concerned with the resolution *ex parte formae* is that to which the name formal logic is attached. It may also be remarked that the division into formal and material is not always founded on the observations made by John of St. Thomas ; it is often based simply on the declaration that in reasoning there are two objects of consideration — its rectitude and its truth.

Once this primary division has been made, the next question is : what are the subjects of each of these parts ? and, what is the order of their consideration ? John of St. Thomas finds the response in the consideration that the advance of the reason from the known to the unknown, which is the subject of the direction of logic, involves three operations — simple apprehension, composition and division, and discourse. Accordingly, the best order to observe is to divide logic according to these three operations.<sup>1</sup>

Clearly the mention of the three operations does not sufficiently specify the parts ; psychology, for instance, also considers the three operations of the reason. What must still be determined is just what, in the case of each operation, constitutes the subject of the formal part of logic. John of St. Thomas presents the answer in this brief formula : “ *Primum ergo apprehendo terminos, deinde compono ex illis propositionem, denique formo ex propositionibus discursum.* ”<sup>2</sup> The three subjects, then, of the formal part of logic, are the term, the proposition, and the discourse, and John of St. Thomas divides this part into three books, each of which looks to one of these three subjects (the last, discourse, includes syllogism and induction).<sup>3</sup>

The explanation of his identification of these three as the subjects is evidently found in an initial conception of this part of logic as being itself a resolution of the form of resolute reasoning. That a science resolve implies that it arrive at a complete and distinct knowledge of

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1. “ *Cum Logica dirigat modum recte ratiocinandi et sint tres actus rationis, in quibus de uno proceditur ad alium . . . non potest melior ordo observari, quam ut tractatum Logicae per has tres operationes distribuamus. Prima operatio nostri intellectus vocatur simplex apprehensio . . . Secunda est compositio aut divisio, cum videlicet ita cognosco rem, ut illi aliquid attribuiam vel negem . . . Tertia operatio est discursus, ut cum ex aliqua veritate nota infero et colligo aliam non notam . . . Primum ergo apprehendo terminos, deinde compono ex illis propositionem, denique formo ex propositionibus discursum* ” (*Ibid.*).

2. *Ibid.*, p.6.

3. “ *Sic ergo in hac prima parte distribuemus tres libros : Primum pro his, quae pertinent ad primam operationem, ubi agemus de simplicibus terminis. Secundum pro secunda operatione, ubi agemus de oratione et propositione eiusque proprietatibus. Tertium pro tertia, ubi agemus de modo discurrendi et formandi syllogismos et inductionem ceteraque pertinentia ad ratiocinandum* ” (*Ibid.*).



its subject by breaking that subject up into its constituent elements and then considering each of these elements. This part of logic, therefore, since logic is a science, must break up the form of reasoning into its elements, which are the term, the simple and ultimate element with which the resolution terminates, and then the proposition, which is first composed of terms. Lastly logic considers the whole as such, which is the discourse.

This interpretation of the conception which leads John of St. Thomas to determine the above three subjects is supported by certain remarks he makes in arriving at his definition of the term. After pointing out that logic is a science, and therefore resolute in mode, he mentions that there must be some ultimate element at which the resolution ends,<sup>1</sup> which element is the term; these considerations indicate the conception mentioned above, namely, that this part of logic consists in the resolution of the form of reasoning.

Since the term is the last element of the resolution (and therefore called term), it is first in the order of composition. As the effect of the simple apprehension it pertains to the first operation, and as the first and simple element presupposed to all composition, it forms the proper starting point of the logician's consideration.<sup>2</sup> John of St. Thomas defines it as "id, ex quo simplex conficitur propositio,"<sup>3</sup> and explains that this definition signifies the most common element, in which all logical composites are ultimately resolved, and which is therefore susceptible of contraction, as a kind of genus, to the noun and verb, subject and predicate, major, minor, and middle terms.<sup>4</sup> John of St. Thomas' consideration of the term does little more than manifest its divisions. In a subsequent article certain strictures will be placed on the term as subject of that part of logic which looks to the first operation.

That part of formal logic that looks to the second operation considers that logical composition which is first composed of terms, and of which the form of reasoning is itself in turn composed; this is the proposition. The formal logic of the third operation looks to the form which is last in the order of composition, being composed of propositions; this is argumentation, or consequence.

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1. "Cum enim mens nostra in scientiis resolutorie procedat, et praesertim in Logica, quae Analytica ab Aristotele dicitur, quia resolutoria, oportet quod sit designabile ultimum elementum seu terminus huius resolutionis, ultra quod non fiat resolutio ab arte" (*Ibid.*, I P. Lib. I, ch. 1, p. 7).

2. "Hoc igitur attendentes dicimus nos agere in praesenti de termino sub conceptu ultimi elementi, in quod terminatur omnis resolutio compositionis logicae, etiam ipsius propositionis et orationis, quia ab hoc ut a primo et simpliciori convenit incipere" (*Ibid.*).

3. *Ibid.*, p. 8.

4. Cf. *ibid.*, left column for a description of this *ratio communissima termini*. JOHN OF ST. THOMAS actually treats the noun and verb, the first contractions of the term, in the part dealing with the first operation (*Ibid.*, cc. 5-6).



The second division of his logic looks to the direction of resolute reasoning on the part of the matter. The condition required in the propositions is that they be necessary and connected *per se*; and accordingly such propositions form the subject of this part of logic.<sup>1</sup> Since *per se* propositions are those in which essential predicates or proper passions are predicated of the subject, the first task of this part of logic is to explain the predicamental order, in which all things are disposed in their genera; the establishment of this order manifests the essential predicates of all subjects. The material part of John of St. Thomas' logic, therefore, is composed principally of the matter of the *Predicables* of Porphyry and the *Predicaments* of Aristotle, which constitute the material logic of the first operation, and of the *Posterior Analytics* of Aristotle. With respect to the latter, it may be pointed out that John of St. Thomas finds in it both the subject matter of the second operation, namely, immediate and *per se* propositions, and of the third, which is the demonstrative syllogism;<sup>2</sup> he considers the propositions (under the heading of the *praecognita* to demonstration), prior to demonstration itself, and then, following demonstration, science.<sup>3</sup>

In beginning the judgment of this division as John of St. Thomas presents it, it must be recalled that, as pointed out above, he founds the division on two terms which appear in the definition of logic — *art* and *reason*. But an inspection of his acceptance of both these terms as they appear in the definition reveals that there is error in his understanding of them. In the first place, he does not first determine the sense in which logic is an art, but seems, from his example of the builder's art, to assume that art is said of logic in the same sense as that in which it is said of the servile arts. Secondly, his definition of resolute reasoning as this is taken as the whole subject of logic is too narrow a meaning of resolute reasoning. The second of these errors is the fundamental mistake; for if resolution, understood as he describes it, were the whole subject of logic, then there would be grounds for the division of logic into formal and material; John of St. Thomas' observations on art, moreover, are rather introductory

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1. Cf. *ibid.*, II P, prooemium, p.250.

2. "... Tota materia artis Logicae, de qua in hac secunda parte agimus, in tribus continetur, scilicet: *In praedicabilibus*, quae sunt modi praedicandi, in quibus distinguitur modus essentialis et quidditativus a modo accidentali vel qualificativo; deinde *in decem praedicamentis*, ad quae tamquam ad decem classes et summa genera reducuntur omnes naturae rerum earumque gradus atque essentialia praedicata; et tandem in libris *Posteriorum*, in quibus docentur formari propositiones necessariae et *per se* et fieri *demonstrationes scientificae*" (*Ibid.*, p.251).

3. *Per se* and immediate propositions, *ibid.*, II P. q.24, a.4; demonstration, *ibid.*, q.25; science, *ibid.*, q.26. This order may be contrasted with that of Aristotle for whom science comes first as the principle of knowledge of the matter of the demonstrative syllogism which is true and proper principles (cf. ST. THOMAS, *In I Post. Anal.*, lect.4-5).

to the division than the principles from which the division proceeds. For this reason the second error will be considered first.

In his definition of logic, John of St. Thomas teaches that it directs the act of reason so as to prevent error in discoursing. He then states that the reason in discoursing and judging proceeds resolutely (*per modum resolutionis*), so that for logic to direct the act of discourse means no more nor less than to direct resolution so as to prevent error therein. In his analysis of the subject of the direction of logic, therefore, there is an identification of the act of discourse, judgment, and resolution. He describes resolution as the process by which the enuntiation to be judged is reduced into its principles and the proofs by which it is manifested are discovered. Next he points out that resolution is twofold, that on the part of the form, which is the subject of Aristotle's *Prior Analytics*, and that on the part of the matter, which pertains to the *Posterior Analytics*. Logic, therefore, is divided into two parts, one of which considers the form of resolute reasoning and the other its matter.

If the subject of logic were resolute reasoning as John of St. Thomas describes it, then it would be true that logic is divided into a formal part, which considers the simple syllogism, resolving it into proposition and term, and a material part, which considers the demonstrative syllogism. But, in fact, the discourse of the reason which is the subject of the direction of logic is broader than the discourse of judgment which is effected by resolution into principles. This is evident from St. Albert's division according to the two kinds of unknown : in attaining knowledge of the simple unknown, a certain discourse is necessary ; similarly, prior to the formation of a resolute syllogism the reason must be able to enuntiate the true and must know the nature and properties of the enuntiation ; the discourse of the reason which is the subject of the direction of logic, therefore, includes the acts of the first two operations in themselves, as well as the judicative discourse of the third operation. To accept the act of judgment as the entire subject of logic is, effectively, to exclude the first two operations from the subject of logic. Thus, when John of St. Thomas divides the subject of his formal logic into three parts according to the three operations of the reason, he determines the subjects of the parts that consider the simple apprehension and composition and division according to something accidental to these operations, that is, as their objects form part of further compositions of the reason ; it is accidental to the first operation that its object be a term in a proposition, and accidental to the second that its object be a proposition in a syllogism.

There is a sense in which resolute reasoning may be said to be the entire subject of logic, since logic is the instrument of speculative science and speculative science is resolute in mode. But resolution understood thus includes the resolution of the object into its material

and formal principles by division and definition, and then the formation of enuntiations prior to judgment through resolute syllogisms; all three of these operations require the direction of logic.<sup>1</sup>

It may here be remarked that the division of logic into formal and material founded on the diversity between the rectitude of reasoning and its truth implies the same error as that just described, namely the acceptance of syllogistic reasoning as the whole subject of logic. Only in the case of argumentation is logic concerned with a form that must be right and a matter that must be true.

The second point regarding John of St. Thomas' division which remains to be considered is his inference that because logic is an art we are to expect that it be divided according to the consideration of form and matter.

Art, the *recta ratio factibilium*, is a habit which enables the reason to direct the making of things as they should be made and with ease. Since those objects which are produced in physical matter which, because of its passivity, lends itself most readily to a certain making or formation, are most properly makeable objects, art according to the strictest meaning of the word is attributed to those arts which direct the making of material objects: "... Factibilia dicuntur illa quae procedunt ab agente in extraneam materiam, sicut scamnum et domus: et horum recta ratio est ars."<sup>2</sup> Such arts are called servile arts.<sup>3</sup>

It is clear that logic is not an art in this strict sense of the word, since in logic there is no question of transitive activity which introduces a form into external matter. It is, however, art in a secondary sense. From the very nature of its subject, as explained above, its intention is the direction of the composition of concepts. It is accordingly concerned with the perfect production of "something in the manner of a certain work,"<sup>4</sup> something, that is, which partakes of the nature of a makeable object in the measure that it results from a certain composition, which composition is governed by determined rules of procedure: "... Omnis applicatio rationis rectae ad aliquid factibile pertinet ad artem... Quia ergo ratio speculativa quaedam facit, puta syllogismum, propositionem, et alia huiusmodi, in quibus proceditur secundum certas et determinatas vias, inde est quod

1. On the nature of resolute reasoning, see EDMUND DOLAN, F.S.C., "Resolution and Composition in Speculative and Practical Discourse," in *Laval théologique et philosophique*, Vol. VI (1950), pp. 9-62.

2. *Q.D. de Veritate*, q.5, a.1, c.

3. For the explanation of the imposition of this name, see O'FLYNN, "The First Meaning of 'Rational Process' according to the *Expositio in Boethium de Trinitate*," in *Laval théologique et philosophique*, Vol. X (1954), p. 170.

4. "... Etiam in ipsis speculabilibus est aliquid per modum cuiusdam operis, puta constructio syllogismi aut orationis congruae, aut opus numerandi aut mensurandi. Et ideo quicumque ad huiusmodi opera rationis habitus speculativi ordinantur, dicuntur per quamdam similitudinem artes" (*Ia IIae*, q.57, a.3, ad 3).

respectu horum potest salvari ratio artis." <sup>1</sup> Since, therefore, art is not univocal as said of the servile arts and of logic, it cannot be assumed that the diverse elements pertaining to the construction of material objects which may serve to divide the consideration of the craftsman, will also divide the science of logic.

Since the servile arts, by definition, are concerned with a material object, it is true that in them both the matter, that which is presupposed, and the form to be introduced, must be known by the craftsman <sup>2</sup> to the extent that knowledge of both is necessary for the production of the object.<sup>3</sup> But in logic, it must first be determined what the makeable objects are which the reason must construct in its advance to science; only after these are known can any question of their composition of a form and a determined matter, and of the relevancy of both of these to the consideration of the logician in each case, be answered. It is these makeable objects — definition, enuntiation, and argumentation — that divide logic.

#### VI. MATERIAL AND FORMAL LOGIC

The burden of the preceding pages has been the manifestation of the proposition that there is no foundation for the division of logic into formal and material. It does not follow, however, that the terms formal and material logic are meaningless. There is in the subject of logic a definite foundation for these terms, and their use can be of service in the understanding of that subject.

As has been pointed out, the subject of logic is second intentions, which are relations of reason that accrue to the object in its state of being known. In the act of knowing, however, two elements may

1. *IIa IIae*, q.47, a.2, ad 3. For the various meanings of the word art, and a more complete explanation of the sense in which logic is an art, see O'FLYNN, *op. cit.*, pp.168-175. It may be noted that there is no opposition between this definition of the common notion of art and that which ST. THOMAS gives at the beginning of his commentary on the *Posterior Analytics*. In the former ST. THOMAS defines art through the notion of a work to be made; in the latter through direction of operations which must be done in a certain way. But the production of anything in the manner of a certain work calls for operations which must be done in a certain determined way. In his commentary on the *Posterior Analytics*, ST. THOMAS omits mention of any work to be made because his aim is to define logic simply through the faculty whose operations it directs.

2. It does not follow, however, as JOHN OF ST. THOMAS seems to imply, that the consideration of the artist is adequately divided by these two. As ST. THOMAS teaches (*In II Ethicorum*, lect.2, nn.255-256), practical reasoning is compositive in mode and must take into consideration all those movements by which the object may be brought into existence. Division is a mode of knowing proper to speculative science, not to practical. From this point of view, too, JOHN OF ST. THOMAS' reference to the servile arts for the principle of the division of logic is badly chosen.

3. On the knowledge which the artist must possess of the matter and the form, see *In II Physicorum*, lect.4, (edit. Pirotta) n.345).

be distinguished : the form which the operation of the reason assumes, and the determined matter, or object, represented by that form. Because of these two elements, relations of reason of two different kinds accrue to the object known — certain ones by reason of the form of the operation, others by reason of what is represented. Those parts of logic which consider second intentions of the first type are called formal logic ; where the subject is relations of the second type, logic is material.

The two kinds of second intentions are exemplified in the enuntiation *man is rational*. Here the form is that necessarily assumed by the second operation of reason in the speculative order — enuntiation. Owing to this form, certain relations accrue to *man*, *is*, and *rational*, namely, noun and verb. But there is another, entirely different, kind of relation to be found in the same enuntiation : since what is here predicated of *man* is something that pertains to his essence, the predication is *per se* ; if however, *is while* were predicate, then the predication would no longer be *per se*, but *per accidens*, although in both cases the form is the same. The second kind of relation, therefore, is clearly founded on what is represented.

This distinction between formal and material logic cannot serve as a principle for dividing logic by determining its subjects. Rather it is known only subsequently to the division ; once the subjects have been determined, then the consideration of them discovers this difference between the kinds of second intentions. The terms formal and material, understood as explained, are of some help as principles of knowledge of the natures of the second intentions to be considered when the different parts of logic are approached. For example, knowing that the *Prior Analytics* is formal logic, while the *Posterior Analytics* is material logic, is of some initial assistance in understanding the difference between proposition and principle, and between predicate as the term of the resolution of the simple syllogism and predicate as the term of the resolution of the dialectical syllogism.

When the distinction between formal and material logic is thus based on the foundation of the second intentions under consideration, it becomes clear that the logic of the first operation is material, for the definition requires no direction on the part of its form ; rather, knowledge of the essence is effected entirely by composition of concepts governed by relations founded on what is represented by those concepts. The signification of the true or the false, on the contrary, is the effect of a form which remains the same independently of what is represented therein ; accordingly, the logic of the second operation is entirely formal. The attainment of certain knowledge through syllogistic reasoning, however, requires that the operation of the reason assume a certain form, namely, the syllogism, and also that certain relations hold good on the part of the matter represented under that form ; both the form and the conditions on the part of the matter fall under the



consideration of the logician, and accordingly the logic of the third act is both formal and material.

John of St. Thomas, in determining what is meant by the matter and what by the form, as these divide logic, first points out that in any art the matter is presupposed, not made, by the artist, while the form is induced. Applying this to logic, he identifies the matter as the things or objects that we wish to know, while the form is the mode or disposition by which the objects known are connected. Since he teaches elsewhere, however, that the subject of logic is second intentions, it may be assumed that what he has in mind as the subject of the resolution *ex parte formae* are second intentions founded on the form and as subject of the resolution *ex parte materiae*, second intentions founded on what is represented by that form. What is misleading, however, is his assimilation of logic to the servile arts in that its principal work is conceived as the induction of a form into matter that is presupposed. The servile arts attain their end when such an induction has been effected ; the end of logic, however, is knowledge of the unknown, and this demands not only the induction of a form into concepts, which is the work only of formal logic, but also the induction of necessity of consequent, which is part of the work of material logic. In this way, both formal and material logic can be said to make something from a matter that is presupposed, namely, simple concepts ; the former makes the first figure syllogism, for instance, and the latter the definition and *per se* propositions. For this reason "that which is presupposed" cannot serve to distinguish the subject of material from that of formal logic. The "making" of logic, moreover, is entirely different from that of the servile arts, for logic makes only by knowing. Its whole subject, second intentions, both those founded on the form, and those founded on determined matter, are given, their natures determined by that of the reason ; logic can do no more than know them *modo speculativo*.

In this article, the question of the division of logic has been considered and the necessity of the division according to the three operations of the reason manifested. Because the logic of the first operation is less known than that of the other parts, while at the same time of fundamental importance because it embraces the art of definition and is essential for a distinct knowledge of argumentation, a second article will follow dealing with this part of logic.

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